

WHAT IS CLAIMED IS:

1. A method of forming a structured web with a paper machine, comprising the steps of:
providing a fiber slurry through a headbox to a nip formed by a structured fabric and a forming fabric; and
collecting fibers from said fiber slurry predominately in a plurality of valleys of said
5 structured fabric.
2. The method of claim 1, further comprising the step of dewatering said fiber slurry through said forming fabric and not through said structured fabric.
3. The method of claim 1, wherein said forming fabric has a zonally different fabric permeability.
4. The method of claim 1, wherein said structured fabric includes a plurality of peaks each of said peaks associated with at least one of said plurality of valleys.
5. The method of claim 4, wherein said fiber slurry substantially covers a portion of a surface of said structured fabric including at least one of said plurality of valleys and at least one adjacent peak.
6. The method of claim 5, wherein said fiber slurry becomes the structured web by way of said collecting step.

7. The method of claim 6, wherein the structured web has a pillow thickness associated with the structured web formed in said valleys, the structured web having a top surface thickness associated with the structured web formed on said peaks, said pillow thickness being one of equal to and greater than said top surface thickness.

8. The method of claim 6, wherein the structured web has a pillow basis weight associated with the structured web formed in said valleys, the structured web having a top surface basis weight associated with the structured web formed on said peaks, said pillow basis
5 weight being one of equal to and greater than said top surface basis weight.

9. The method of claim 6, further comprising the steps of:
removing said forming fabric from the structured web;
contacting the structured web with a dewatering fabric; and
applying pressure to the structured web through said dewatering fabric.

10. The method of claim 9, further comprising the step of applying a negative air pressure against a portion of a surface of said dewatering fabric thereby removing moisture from the structured web through said dewatering fabric.

11. The method of claim 6, further comprising the steps of:
transferring the structured web to a Yankee dryer at a transfer point; and
retaining the structured web with said structured fabric until reaching said transfer point.

12. The method of claim 11, wherein the structured web remains on said structured fabric until said transfer point thereby ensuring that pillow areas of the structured web formed in said valleys have a higher basis weight than the rest of the structured web and said pillow areas stay impressed.

13. A structured fibrous web, comprising:
a plurality of pillow portions each having a first basis weight property; and
a plurality of connection portions each having a second basis weight property, each of
5 said connection portions connecting at least two of said plurality of pillow portions, said first basis weight being greater than said second basis weight.

14. The structured fibrous web of claim 13, wherein said plurality of pillow portions have a first thickness and said plurality of connection portions have a second thickness, said first thickness greater than said second thickness.

15. A method of forming a structured web in a papermaking machine, comprising the steps of:
supplying a fiber slurry to a nip, said nip formed by a structured fabric and a forming fabric;
5 dewatering said fiber slurry through said forming fabric, thereby creating the web; and
retaining the web with said structured fabric through at least one dewatering process.

16. The method of claim 15, further comprising the step of transferring the web from said structured fabric to a Yankee dryer.

17. The method of claim 15, wherein said structured fabric includes peaks and valleys.

18. The method of claim 17, wherein said valleys form pillows in the web and said peaks form pressing points in the web.

19. The method of claim 18, wherein said pillows have a first thickness and said pressing points have a second thickness, said first thickness greater than said second thickness.

20. The method of claim 18, wherein said pillows have a first basis weight and said pressing points have a second basis weight, said first basis weight greater than said second basis weight.

21. The method of claim 18, wherein said pillows have a first moisture content and said pressing points have a second moisture content, said first moisture content greater than said second moisture content prior to a drying process.

22. A structured fabric for use in a paper machine, comprising:
a plurality of yarns woven together having a mesh count and a weave pattern, said weave pattern including valleys of from approximately 0.07 mm to approximately 0.60 mm deep.

23. The structured fabric of claim 22, wherein said mesh count is between 95 x 120 and 26 x 20.

24. The structured fabric of claim 22, wherein said mesh count is one of greater than and equal to 51 x 36.

25. The structured fabric of claim 24, wherein said mesh count is one of greater than and equal to 58 x 44.

26. The structured fabric of claim 22, wherein said mesh count is one of less than and equal to 42 x 31.

27. The structured fabric of claim 26, wherein said mesh count is one of less than and equal to 36 x 30.

28. The structured fabric of claim 22, wherein said weave pattern includes one of greater than and equal to 4 shed repeats.

29. The structured fabric of claim 28, wherein said weave pattern includes one of greater than and equal to 5 shed repeats.

30. The structured fabric of claim 22, wherein said plurality of yarns include a plurality of warp yarns and a plurality of weft yarns.

31. The structured fabric of claim 30, wherein said warp yarns each have a diameter of between approximately 0.12 mm and 0.70 mm.

32. The structured fabric of claim 30, wherein said weft yarns each have a diameter of between approximately 0.15 mm and 0.60 mm.

33. The structured fabric of claim 22, wherein said plurality of yarns each have a cross-sectional shape, said cross-sectional shape including at least one of round, ovate and flat.

34. The structured fabric of claim 22, wherein said plurality of yarns are made of at least one of thermoplastic and thermoset polymeric materials.

35. The structured fabric of claim 22, wherein said plurality of yarns woven together form a surface, said surface being treated to alter a characteristic of said surface, said characteristic including at least one of surface energy, thermal resistance, abrasion resistance and hydrolysis resistance.

36. The structured fabric of claim 22, further comprising a polymeric material applied to a surface of said plurality of yarns woven together.

37. The structured fabric of claim 36, wherein said polymeric material is applied in a pattern.

38. The structured fabric of claim 22, wherein said plurality of yarns woven together form a surface, a portion of said surface being a top contact plane, said top contact plane being one of greater than and equal to approximately 10% of the area of said surface.

39. The structured fabric of claim 38, wherein said top contact plane is one of greater than and equal to approximately 20% of the area of said surface.

40. The structured fabric of claim 39, wherein said top contact plane is one of greater than and equal to approximately 30% of the area of said surface.

41. The structured fabric of claim 38, wherein said top contact plane is formed by abrading said surface.

42. A structured element for use in a paper machine, comprising:

An elastomeric cast structure including valleys of from approximately 0.07 mm to approximately 0.60 mm deep and a surface.

43. The structured element of claim 42, wherein said elastomeric cast structure is made of at least one of thermoplastic and thermoset polymeric materials.

44. The structured element of claim 42, wherein a portion of said surface is a top contact plane, said top contact plane being one of greater than and equal to approximately 10% of the area of said surface.

45. The structured element of claim 44, wherein said top contact plane is one of greater than and equal to approximately 20% of the area of said surface.

46. The structured element of claim 45, wherein said top contact plane is one of greater than and equal to approximately 30% of the area of said surface.

47. A fiber web forming apparatus, comprising:

a headbox;

a forming roll;

a structured fabric;

5 a forming fabric, a portion of one of said structured fabric and said forming fabric in contact with a portion of said forming roll, a side of said structured fabric and a side of said forming fabric becoming proximate to each other thereby forming a nip, said headbox discharging a fibrous slurry directed at said nip, said fibrous slurry losing moisture through said forming fabric and not through said structured fabric.

48. The apparatus of claim 47, wherein said forming fabric includes a surface having a zonally different fabric permeability.

49. The apparatus of claim 47, wherein said structured fabric includes a plurality of valleys and a plurality of peaks.

50. The apparatus of claim 49, wherein said fiber slurry substantially covers a portion of a surface of said structured fabric including at least one of said plurality of valleys and at least one adjacent peak.

51. The apparatus of claim 50, wherein said fiber slurry becomes a fiber web after said moisture is removed through said forming fabric.

52. The apparatus of claim 51, wherein said fiber web has a pillow thickness associated with said fiber web formed in said valleys, said fiber web having a top surface thickness associated with said fiber web formed on said peaks, said pillow thickness being one of equal to and greater than said top surface thickness.

53. The apparatus of claim 51, further comprising a press section including:

a dewatering fabric, said forming fabric being removed from said fiber web and said dewatering fabric contacting said fiber web; and

a pressure device applying pressure to a surface of said dewatering fabric, a portion of
5 said pressure being transferred to a portion of said fiber web.

54. The apparatus of claim 53, further comprising a vacuum device applying a negative air pressure against a portion of a surface of said dewatering fabric thereby removing moisture from said fiber web through said dewatering fabric.

55. The apparatus of claim 54, wherein said vacuum device is a vacuum roll.

56. The apparatus of claim 47, further comprising an extended nip press belt in partial contact with an other side of said structured fabric.

57. The apparatus of claim 56, further comprising an airflow device additionally passing air through said extended nip press belt.

58. The apparatus of claim 47, further comprising at least one of a Yankee roll, a suction roll, a hot air hood, a boost dryer, an air press, an HPTAD and a two pass HPTAD, said fibrous web conveyed in a machine direction, said at least one of a Yankee roll, a suction roll, a hot air hood, a boost dryer, an air press, a single pass HPTAD and a two pass HPTAD being
5 downstream in said machine direction from said nip.

59. A method of drying a fibrous web in a paper machine, comprising the steps of:
forming a structured web between a structured fabric and a forming fabric; and
removing moisture from the structured web through said forming fabric and not through
said structured fabric.

60. The method of claim 59, further comprising the steps of:
removing said forming fabric from said structured web;
contacting the structured web with a dewatering fabric; and
applying pressure to the structured web through said dewatering fabric.

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61. The method of claim 60, wherein said step of applying pressure comprises applying a low pressure in an extended nip press.

62. The method of claim 60, further comprising the step of applying a negative air pressure against a portion of a surface of said dewatering fabric thereby removing moisture from the structured web through said dewatering fabric.

63. A method of forming a structured web with a Twin Wire paper machine, comprising the steps of:

providing a fiber slurry to a nip formed by a first structured fabric and a forming fabric;
5 dewatering said fiber slurry through said forming fabric and not through said structured fabric, thereby forming the structured web; and
transferring the structured web to a second structured fabric.

64. The method of claim 63, wherein said first structured fabric has a first coarseness and said second structured fabric has a second coarseness, said second coarseness being one of greater than and equal to said first coarseness.